

Claims

1. A device for managing air temperature and/or humidity and/or air quality at a site, the site having a temperature and environment management system, the temperature and environment management system being supplied with energy from at least one energy provider through a distribution network, comprising:

a processor;

a communications channel coupled to the temperature and environment management system and the processor;

a display coupled to the processor; and,

a control panel coupled to the processor for receiving input from a user and sending the input to the processor, the processor for receiving the input and responsively controlling operation of the temperature and environment management system, the processor for receiving a characteristic of the energy and displaying the characteristic on the display.

2. A device, as set forth in claim 1, wherein the characteristic of the energy is related to the availability of the energy.

3. A device, as set forth in claim 2, wherein the availability of the energy is related to at least one of the demand for energy and a cost to the customer site.

4. A device, as set forth in claim 1, wherein the characteristic is one of peak or non-peak demand.

5. A device, as set forth in claim 1, wherein the characteristic is related to a cost of the energy.

6. A device, as set forth in claim 5, wherein the cost is a relative cost.
7. A device, as set forth in claim 5, wherein the characteristic is displayed graphically using a symbol.
8. A device, as set forth in claim 7, wherein at least one of a color, a size and a number of symbols displayed provides an indication of the characteristic.
9. A device, as set forth in claim 1, wherein the display and control panel are implemented in a graphic user interface.
10. A device, as set forth in claim 1, wherein the processor is coupled to the energy provider and the characteristic is received from the energy provider.
11. A system for managing environmental comfort at a site, the site having a temperature and environment management system, the temperature and environment management system being supplied with energy from an energy provider through a distribution network, comprising:
  - a humidity sensor for sensing humidity at the site;
  - a temperature sensor for sensing air temperature at the site;
  - an thermostatic device coupled to the humidity sensor and the temperature sensor for receiving input from a user, the input including a temperature setpoint, the thermostatic device for determining an effective setpoint as a function of the temperature setpoint and the sensed humidity and for controlling the temperature and environment management system to maintain air temperature at the site with a deadband defined by the effective setpoint and an offset.

12. A system, as set forth in claim 11, wherein the thermostatic device includes a processor, a communications channel coupled to the temperature and environment management system, a display coupled to the processor, and a control panel coupled to the processor for receiving input from the user.

13. A system, as set forth in claim 12, wherein the thermostatic device receives a characteristic of the energy and displays the characteristic on the display.

14. A device, as set forth in claim 12, wherein the display and control panel are implemented in a graphic user interface.

15. A system, as set forth in claim 11, wherein the effective setpoint is equal to the temperature setpoint plus a predetermined number of degrees per a predetermined percentage increase in relative humidity.

16. A system, as set forth in claim 15, wherein the thermostatic device tracks user adjustments to the temperature setpoint and responsively modifies at least one of the predetermined number of degrees and the predetermined percentage change in relative humidity.

17. A system, as set forth in claim 11, wherein the thermostatic device is coupled to the energy provider by a communications link, the thermostatic device receiving a characteristic of the energy, wherein the thermostatic device modifies the predetermined offset as a function of the characteristic.

18. A system, as set forth in claim 17, wherein the characteristic is related to availability of the energy.

19. A system, as set forth in claim 17, wherein the characteristic is related to a cost of the energy.

20. A system, as set forth in claim 11, wherein the temperature and environment management system includes at least one of a humidifier and a de-humidifier, wherein the thermostatic device control the at least one of a humidifier and a de-humidifier as function of the effective setpoint, the predetermined offset, and the sensed temperature and humidity.

21. A system, as set forth in claim 10, wherein the thermostatic device allows the customer to define a plurality of occupancy modes, each occupancy mode having a user defined temperature setpoint.

22. A system, as set forth in claim 21, wherein each occupancy mode includes a default offset.

23. A system, as set forth in claim 21, wherein at least one occupancy mode has an associated recovery time, the recovery time being a desired time period in which the system transitions between a previous occupancy mode and the at least one occupancy mode.

24. A system, as set forth in claim 23, wherein the thermostatic device allows the user to set at least one start time for the at least one occupancy mode.

25. A system, as set forth in claim 24, wherein the system being adapted to transition from the previous occupancy mode to the at least one occupancy mode at a time equal to the at least one start time minus the recovery time.

26. A system for managing environmental comfort at a site of a customer, the site having a temperature and environment management system, the temperature and environment management system being supplied with energy from an energy provider through a distribution network, comprising:

a temperature sensor for sensing air temperature at the site; and,

a thermostatic device for receiving a characteristic of the energy, the thermostatic device being coupled to the temperature sensor for receiving input from a user, the input including a temperature setpoint, the thermostatic device for controlling the temperature and environment management system to maintain air temperature at the site as a function of the temperature setpoint, the characteristic, and a pre-selected scenario.

27. A system, as set forth in claim 26, wherein the thermostatic device includes a processor, a communications channel coupled to the temperature and environment management system and the processor, a display coupled to the processor, and a control panel coupled to the processor for receiving input from a user and sending the input to the processor, the processor for receiving the input and responsively controlling operation of the temperature and environment management system.

28. A system, as set forth in claim 27, wherein the processor is coupled to the energy provider and the characteristic is received from the utility.

29. A system, as set forth in claim 26, wherein the characteristic is related to the availability of the energy.

30. A system, as set forth in claim 26, wherein the characteristic is related to the cost of the energy.

31. A system, as set forth in claim 26, wherein the characteristic is one of a set of characteristics.

32. A system, as set forth in claim 26, wherein the set of characteristics includes low, medium, and high.

33. A system, as set forth in claim 32, wherein the set of characteristics includes critical.

34. A system, as set forth in claim 26, wherein the scenario is related to the customer's willingness to pay for the energy.

35. A system, as set forth in claim 26, wherein the pre-selected scenario is one of a set of scenarios.

36. A system, as set forth in claim 32, wherein the set of scenarios includes maximum savings, balanced savings and comfort, and maximum comfort.

37. A system, as set forth in claim 26, wherein the thermostatic device controls the temperature and environment management system to maintain air temperature at the site with a deadband defined by the temperature setpoint and a predetermined offset, where the predetermined offset is determined as a function of the characteristic and the scenario.

38. A system, as set forth in claim 26, wherein the characteristic is related to the availability of the energy and is one of a set of characteristics and the scenario is related to the customer's willingness to pay and one of a set of scenarios.

39. A system, as set forth in claim 38, wherein the set of characteristics includes low, medium, and high and the set of scenarios includes maximum savings, balanced savings and comfort and maximum comfort.

40. A system, as set forth in claim 26, wherein the scenario is selected by the customer.

41. A system for managing environmental comfort at a site of a customer, the site having a temperature and environment management system, the temperature and environment management system being supplied with energy from an energy provider through a distribution network, comprising:

a temperature sensor for sensing air temperature at the site; and,

a thermostatic device being coupled to the temperature sensor for establishing a thermal gain characteristic of the site and a base line of consumption as a function of the thermal gain characteristic and for receiving input from a user, the input including a temperature setpoint, the thermostatic device for determining for controlling the temperature and environment management system at a demand and consumption rate determined as a function of the temperature setpoint, the characteristic and the base line of consumption.

42. A system, as set forth in claim 41, wherein the demand and consumption rate is generally flat.

43. A system, as set forth in claim 41, wherein the demand and consumption rate is a relatively reduced rate.

44. A method for managing air temperature and/or humidity and/or air quality at a site, the site having a temperature and environment management system, the temperature and environment management system being supplied with energy from an energy provider through a distribution network, comprising:

receiving a characteristic of the energy;

displaying the characteristic of the energy on a display of a thermostatic device at the site;

receiving input from a user on the thermostatic device; and,

controlling operation of the temperature and environment management system as a function of the user input.

45. A method, as set forth in claim 44, wherein the characteristic of the energy is related to the availability of the energy.

46. A method, as set forth in claim 44, wherein the characteristic is one of peak or non-peak demand.

47. A method, as set forth in claim 44, wherein the characteristic is related to the cost of the energy.

48. A method, as set forth in claim 47, wherein the cost is a total cost.

49. A method, as set forth in claim 47, wherein the characteristic is displayed graphically using a symbol.

50. A method, as set forth in claim 49, at least one of a color, a size and a number of symbols displayed provides an indication of the characteristic.



51. A method, as set forth in claim 44, wherein the display and control panel are implemented in a graphic user interface.

52. A method, as set forth in claim 44, wherein the characteristic is received from the energy provider.

53. A method for managing air quality at a site, the site having a temperature and environment management system, the temperature and environment management system being supplied with energy from an energy provider through a distribution network, comprising:

sensing humidity at the site;

sensing air temperature at the site;

receiving input from a user, the input including a temperature setpoint;

determining an effective setpoint as a function of the temperature setpoint and the sensed humidity; and,

controlling the temperature and environment management system to maintain air temperature at the site with a deadband defined by the effective setpoint and a predetermined offset.

54. A method, as set forth in claim 53, including the steps of receiving a characteristic of the energy and displaying the characteristic on a display.

55. A method, as set forth in claim 53, wherein the effective setpoint is equal to the temperature setpoint plus a predetermined number of degrees per a predetermined percentage increase in relative humidity.

56. A method, as set forth in claim 55, further including the step of tracking user adjustments to the temperature setpoint and responsively modifying at least one of the predetermined number of degrees and the predetermined percentage change in relative humidity.

57. A method, as set forth in claim 53, including the step of receiving a characteristic of the energy and modifying the predetermined offset as a function of the characteristic.

58. A method, as set forth in claim 57, wherein the characteristic is related to availability of the energy.

59. A method, as set forth in claim 57, wherein the characteristic is related to a cost of the energy.

60. A method, as set forth in claim 53, including the step of controlling at least one of a humidifier and a de-humidifier as function of the effective setpoint, the predetermined offset, and the sensed temperature and humidity.

61. A method, as set forth in claim 53, including the step of allowing the customer to define a plurality of occupancy modes, each occupancy mode having a user defined temperature setpoint.

62. A method, as set forth in claim 61, wherein each occupancy mode includes a default offset.

63. A method, as set forth in claim 61, wherein at least one occupancy mode has an associated recovery time, the recovery time being a desired time period in which the system transitions between a previous occupancy mode and the at least one occupancy mode.

64. A method, as set forth in claim 63, including the step of allowing the user to set at least one start time for the at least one occupancy mode.

65. A method, as set forth in claim 64, including the step of transitioning from the previous occupancy mode to the at least one occupancy mode at a time equal to the at least one start time.

66. A method for managing air quality at a site of a customer, the site having a temperature and environment management system, the temperature and environment management system being supplied with energy from an energy provider through a distribution network, comprising:

sensing air temperature at the site; and,

receiving a characteristic of the energy;

receiving input from a user, the input including a temperature setpoint; and,

controlling the temperature and environment management system to maintain air temperature at the site as a function of the temperature setpoint, the characteristic, and a pre-selected scenario.

67. A method, as set forth in claim 66, wherein the characteristic is received from the energy provider.

68. A method, as set forth in claim 66, wherein the characteristic is related to the availability of the energy.

69. A method, as set forth in claim 66, wherein the characteristic is related to the cost of the energy.

70. A method, as set forth in claim 66, wherein the characteristic is one of a set of characteristics.

71. A method, as set forth in claim 66, wherein the set of characteristics includes low, medium, and high.

72. A method, as set forth in claim 71, wherein the set of characteristics includes critical.

73. A method, as set forth in claim 66, wherein the scenario is related to the customer's willingness to pay for the energy.

74. A method, as set forth in claim 66, wherein the pre-selected scenario is one of a set of scenarios.

75. A method, as set forth in claim 74, wherein the set of scenarios includes maximum savings, balanced savings and comfort, and maximum comfort.

76. A method, as set forth in claim 66, wherein the thermostatic device controls the temperature and environment management system to maintain air temperature at the site with a deadband defined by the temperature setpoint and a predetermined offset, where the predetermined offset is determined as a function of the characteristic and the scenario.

77. A method, as set forth in claim 66, wherein the characteristic is related to the availability of the energy and is one of a set of characteristics and the scenario is related to the customer's willingness to pay and one of a set of scenarios.

78. A method, as set forth in claim 77, wherein the set of characteristics includes low, medium, and high and the set of scenarios includes maximum savings, balanced savings and comfort and maximum comfort.

79. A method, as set forth in claim 78, wherein the set of characteristics further includes critical.

80. A method, as set forth in claim 60, wherein the scenario is selected by the customer.

81. A method for managing air quality at a site of a customer, the site having a temperature and environment management system, the temperature and environment management system being supplied with energy from an energy provider through a distribution network, comprising:

sensing air temperature at the site; and,

establishing a thermal gain characteristic of the site and a base line of consumption as a function of the thermal gain characteristic;

receiving input from a user, the input including a temperature setpoint; and,

controlling the temperature and environment management system at a demand and consumption rate determined as a function of the temperature setpoint, the characteristic and the base line of consumption.

82. A method, as set forth in claim 81, wherein the demand and consumption rate is generally flat.

83. A method, as set forth in claim 81, wherein the demand and consumption rate is a relatively reduced rate.